

Practice Exercise #04: Basic Statistics

http://www.comp.nus.edu.sg/~cs1020/4_misc/practice.html

Reference: Week 2 Arrays

Objectives:

1. Using array
2. Using **DecimalFormat** class

Task statement:

Given n values X_1, X_2, \dots, X_n , the **mean** (average) μ is defined as follows:

$$\mu = \frac{1}{n} \sum_{i=1}^n X_i$$

The **variance** var is defined as follows:

$$var = \frac{1}{n} \sum_{i=1}^n (X_i - \mu)^2$$

And the **standard deviation** σ is the square root of variance:

$$\sigma = \sqrt{var}$$

Write **Statistics.java** to read in n , the number of values, followed by n integer values, and compute μ and σ . You may assume that $n > 0$.

The values μ and σ should be shown in 3 decimal places, and you are to use the **DecimalFormat** class.

Your program should contain the following methods. You may add additional methods if you deem it necessary.

- **public static int[] readArray():** To read the input data and return the integer array to the caller.
- **public static double computeMean(int[] arr):** To compute the mean of the values in arr.
- **public static double computeStdDev(int[] arr):** To compute the standard deviation of the values in arr.

You must not change the method headers given above.

In the skeleton program provided, it includes a **printArray(int[] arr)** method for your testing purpose.

Sample run #1:

Enter size of array: 3
Enter 3 values:
2 5 3
Mean = 3.333
Standard deviation = 1.247

Sample run #2:

Enter size of array: 10
Enter 10 values: ← note the plural word "values"
19 213 -42 76 100 27 -35 -12 57 171
Mean = 57.400
Standard deviation = 80.567

Sample run #3:

Enter size of array: 1
Enter 1 value: ← note the singular word "value"
12345
Mean = 12345.000
Standard deviation = 0.000